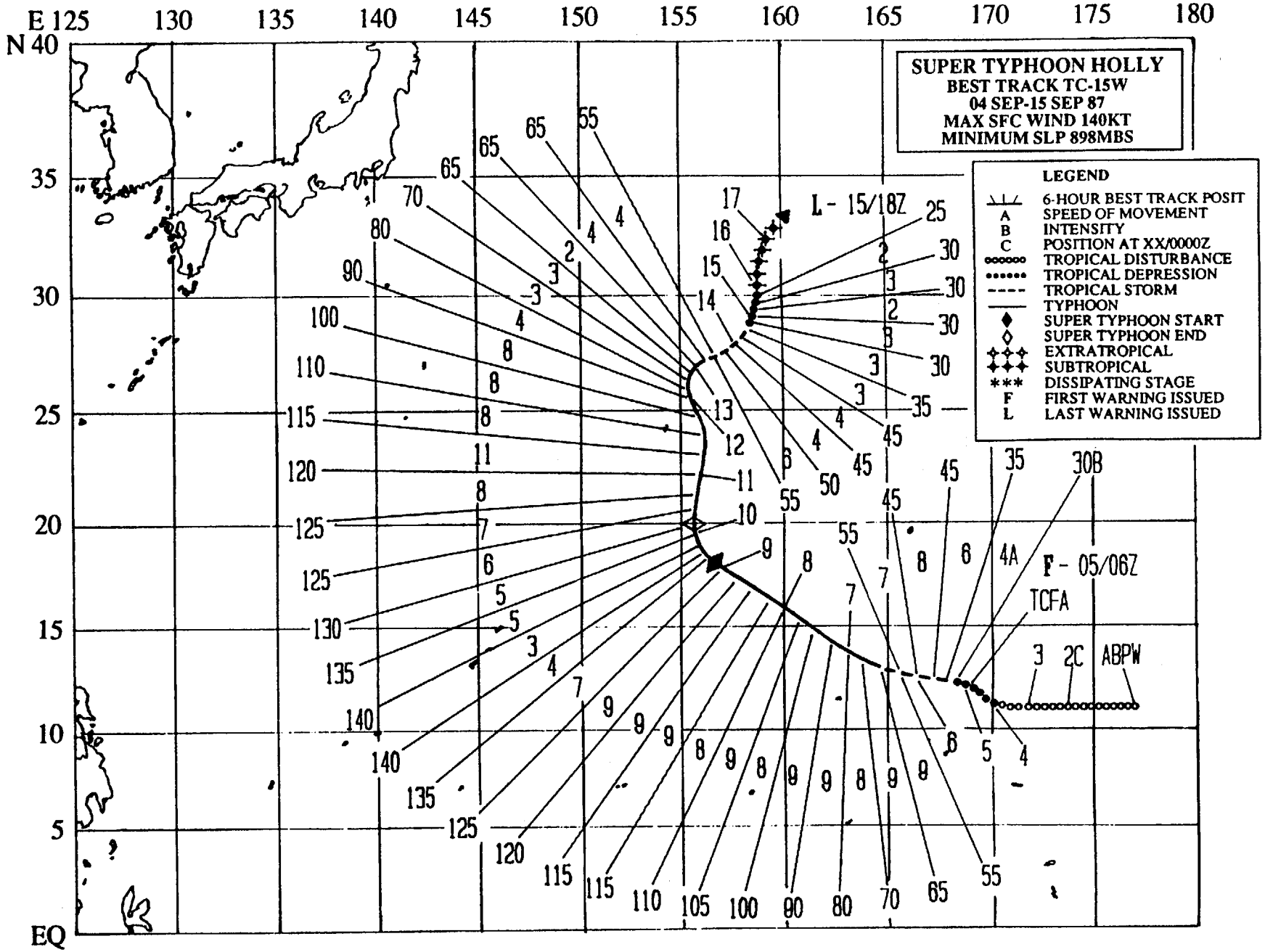
SUPER TYPHOON HOLLY
BEST TRACK TC-15W
04 SEP-15 SEP 87
MAX SFC WIND 140KT
MINIMUM SLP 898MBS
LEGEND
6-HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
SUBTROPICAL
DISSIPATING STAGE
F FIRST WARNING ISSUED
L LAST WARNING ISSUED
L - 15/18Z
F - 05/06Z
TCFA
ABPW
E 125
130
135
140
145
150
155
160
165
170
175
180
N 40
35
30
25
20
15
10
5
EQ

SUPER TYPHOON HOLLY (15W)

In early September the active monsoonal trough spawned a three tropical cyclone outbreak. Super Typhoon Holly was one of the three. Typhoons Freda (13W) and Gerald (14W) were first warned on at 041800Z September, with Holly following 12-hours later. As these three systems matured, the monsoon trough became displaced well to the north of its "normal" location (see Figures 3-15-1 and 3-15-2). In fact, by the 11th of September, Holly, Typhoon Freda (13W) and the remains of Typhoon Gerald (14W) were all north of 15 degrees North Latitude as an anticyclonic circulation developed in low-latitudes just north of the island of Pohnpei in the eastern Caroline Islands. This anomalous low-latitude high pressure suppressed additional cyclogenesis for the next four days (see Figure 3-15-3). Monsoonal troughing began to reappear on the 171200Z surface/gradient-level streamline analysis and was firmly re-established a day and a half later.

Holly began as a westward-moving area of persistent, but weakly organized, convection at the eastern end of the monsoon trough 560 nm (1037 km) east-northeast of Kwajalein and was first mentioned on the Significant Tropical Weather Advisory (ABPW PGTW) at 010600Z. As Holly developed over the next three days, satellite reconnaissance intensity estimates (Dvorak, 1984) of maximum sustained surface winds indicated an increase from 25 kt (13 m/sec) to 30 kt (15 m/sec). Vertical wind shear

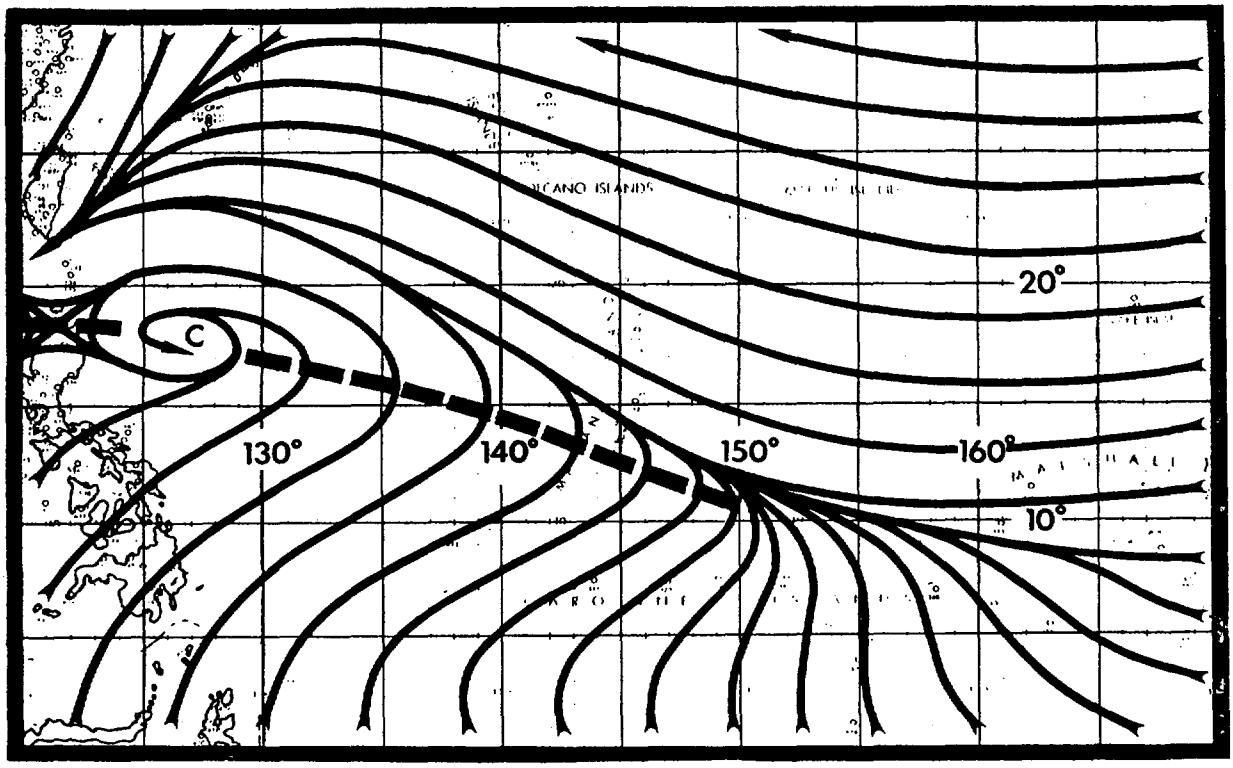

Figure 3-15-1. Gradient-level wind climatology for September (Sadler, et al, 1987).

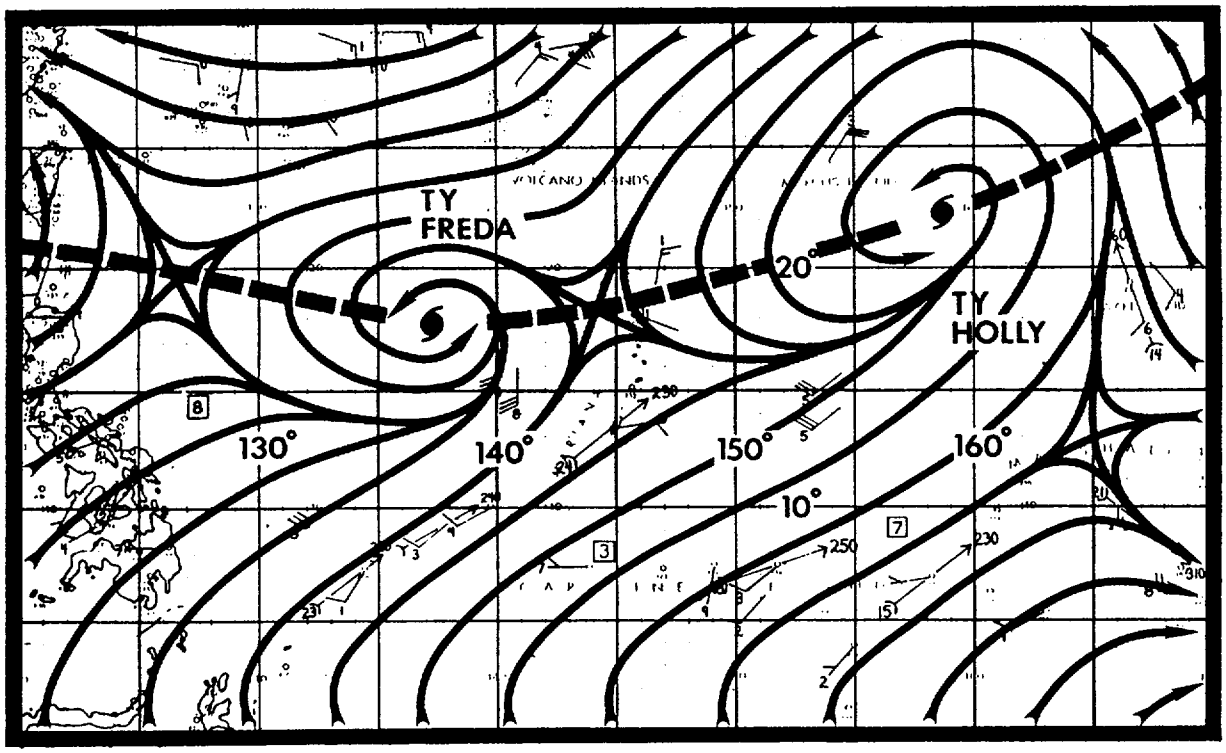

Figure 3-15-2. Low-level troughing is shown on this surface/gradient-level streamline analysis from 110000Z September well north of its climatological position (see Figure 3-15-1) due to the combined influences of Typhoons Freda (13W) and Holly, and the remains of Typhoon Gerald (14W).

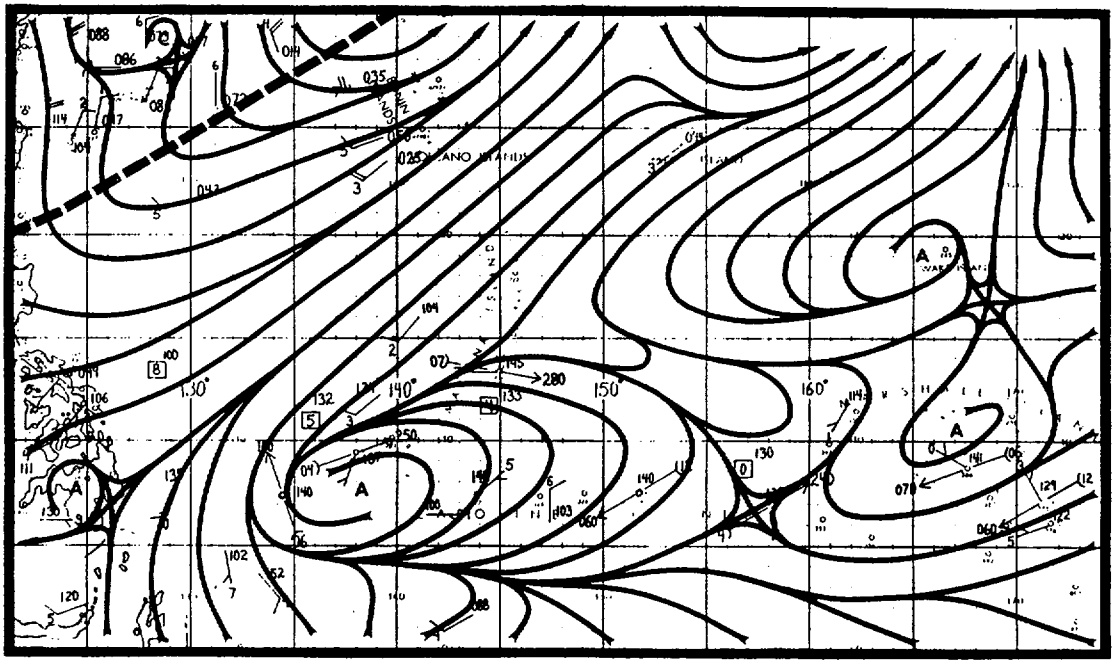

Figure 3-15-3. Ridging, shown as a band of anticyclones on this surface/gradient-level analysis for 161200Z September developed in latitudes normally expected to show monsoonal troughing. This appears to have been a key element in the suppression of further low-latitude tropical cyclone genesis through the 19th.

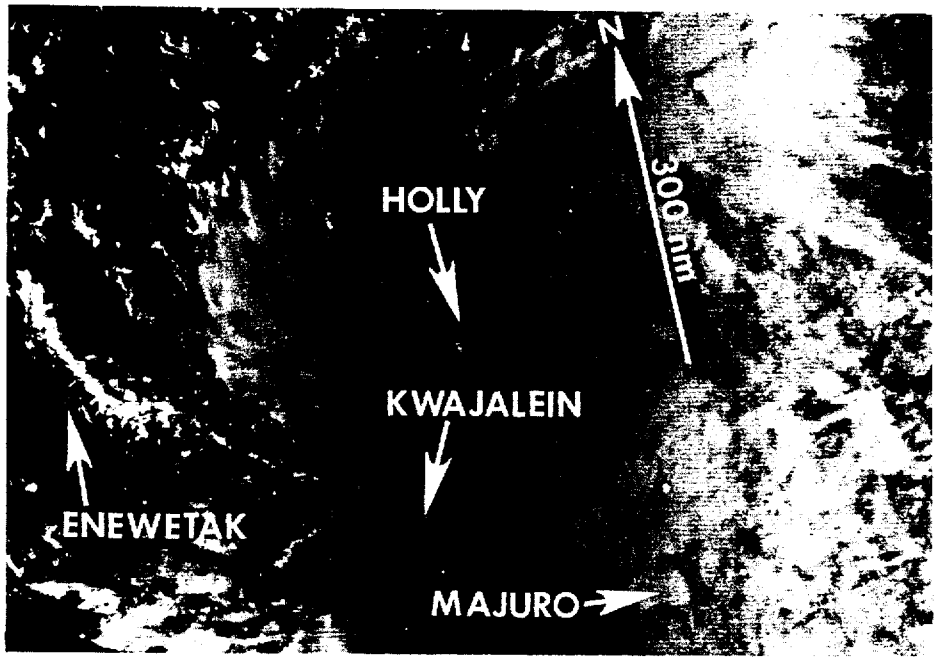

Figure 3-15-4. Holly near the time of its first warning (050721Z September DMSP visual imagery).

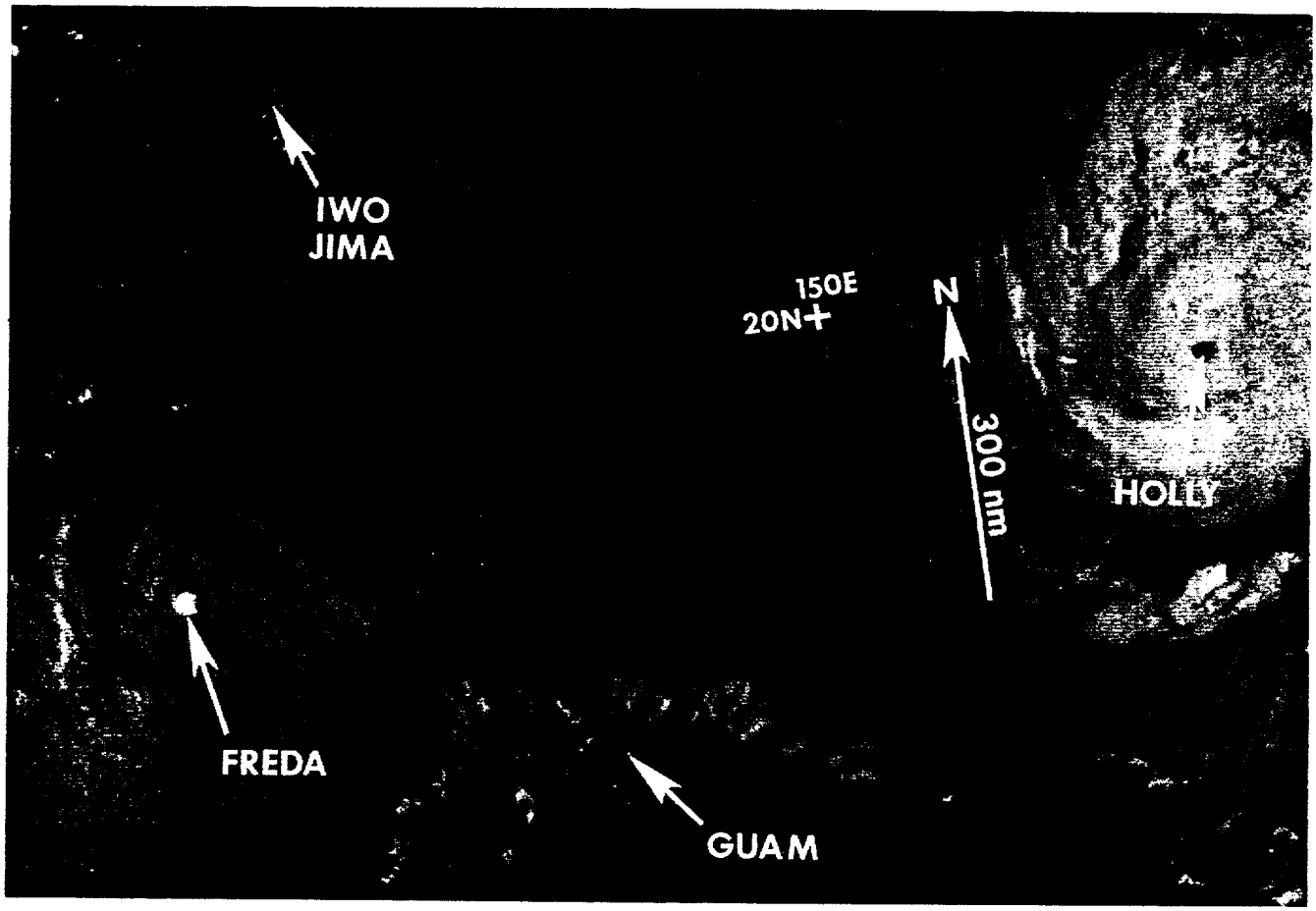

FIgure 3-15-5. Super Typhoon Holly at peak intensity. Typhoon Freda (13W) appears to the left of Holly (091210Z September DMSP visual imagery).

over the system remained low (not more than 10 kt (5 m/sec)), favoring development. Surface/gradient-level streamline analysis at 040000Z showed moderate low-level cross-equatorial flow from the south into the disturbance. This was apparent from the southwesterly gradient-level winds at Truk (WMO 91334) and Pohnpei (WMO 91348) at 040000Z. Minimum sea-level pressures were 1006 mb in Holly with the mean environmental pressures near 1009 mb. This combination, together with indications that the deepest convection was consolidating about the low-level circulation center, supported the issuance of a Tropical Cyclone Formation Alert at 041930Z.

The first warning on Tropical Depression 15W followed at 050600Z. At that time, the maximum sustained surface winds were 30 kt (15 m/sec), with a forecast increase to 35 kt (18 m/sec) the next day. Satellite imagery on the 5th showed favorable upper-level outflow and a ragged central convective mass about 2 1/2 degrees in diameter (Figure 3-15-4). Associated convective bands southwest and east of the center implied a large-scale circulation and little competition for energy from Typhoon Freda (13W) to the west. As a consequence, Holly developed from 30 kt (15 m/sec) at the time of the first warning to 90 kt (46 m/sec) at the time of the ninth warning at 070600Z.

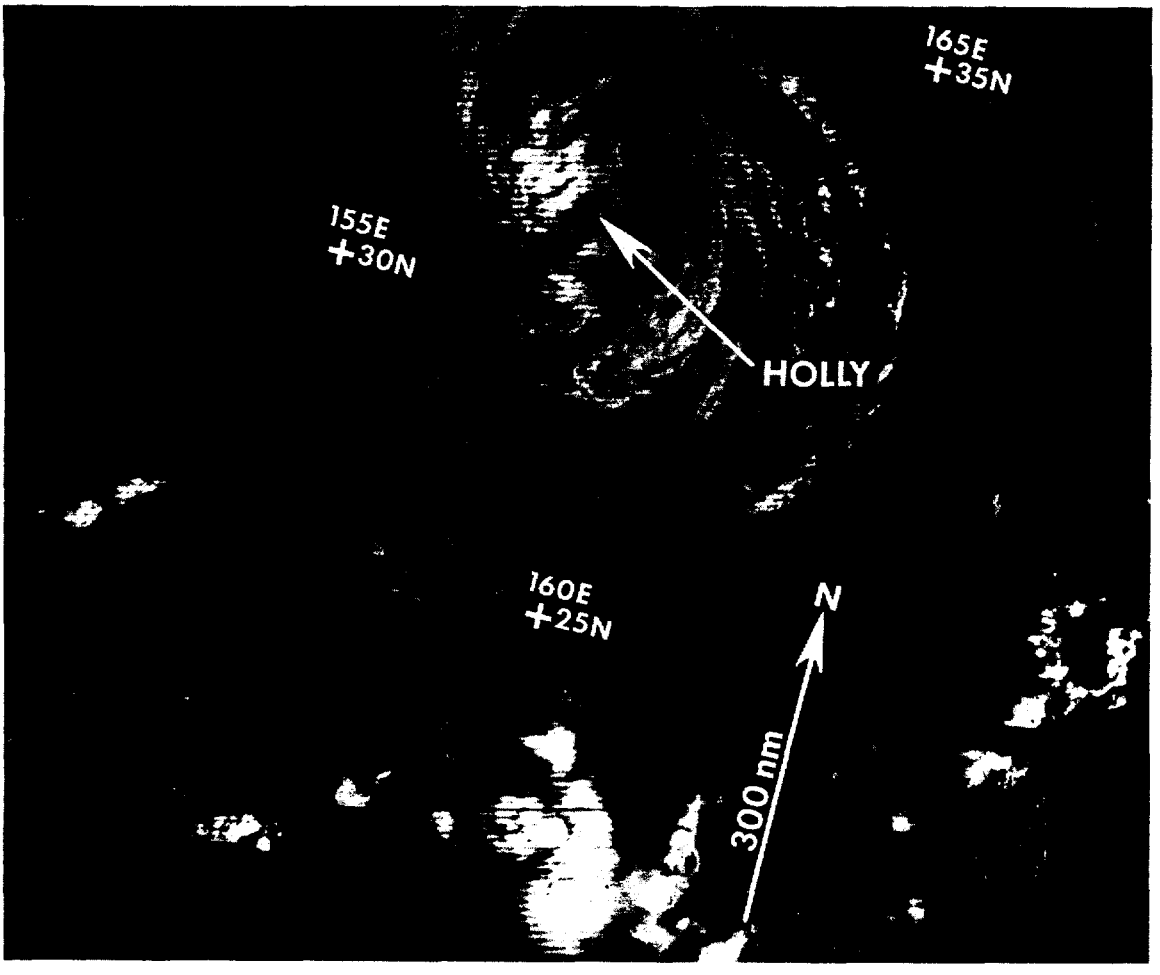

Figure 3-15-6. The subtropical remains of Holly (162227Z September DMSP visual imagery).

Holly's track abruptly changed from northwestward to northward at a position approximately 720 nm (1333 km) northeast of Guam. A maximum intensity of 140 kt (72 m/sec) was reached at 091200Z (Figure 3-15-5). Sparse upper-air and synoptic data did not clearly show a specific weakness in the subtropical ridge to the north of Holly. As a result, the early forecast tracks called for west-northwestward or westward movement. However, the relative movement and displacement of the monsoonal trough and the weakness of the subtropical ridge appear to have caused Holly's northward movement. (By the 10th, Typhoon Freda (13W) was about 950 nm (1759 km) to the west-southwest and drifting slowly west-northwestward. No binary interaction was apparent between Holly and Typhoon Freda (13W).) With no strong mid-latitude systems approaching to provide stronger westerly or southwesterly steering flow, Holly (along with Typhoon Freda (13W)) drifted slowly northward in the active monsoon trough and weakened. Holly acquired subtropical characteristics after 140300Z, and retained 45 kt (23 m/sec) maximum sustained surface winds. Its remnants could still be located on satellite imagery through the 17th (Figure 3-16-6), with the final satellite fix obtained at 170600Z. No reports of damage or loss of life were attributed to Holly during its lifetime.